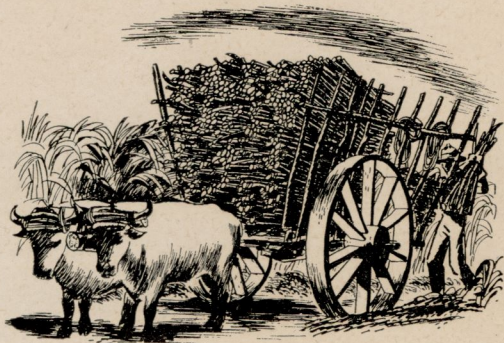


The Story of Cane Sugar

"Sweeten it



with Domino"

The American Sugar Refining Company



THE STORY OF CANE SUGAR

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ABOUT two-thirds of the world's sugar supply is derived from the sweet juice of sugar cane, a tropical plant, growing only in a warm, moist climate. Successful cultivation of sugar cane is concentrated in a few choice locations which fall within the area bounded by the 35th parallels North and South of the Equator.

There is definite indication that sugar cane was known and its juice highly valued hundreds of years before the birth of Christ. An obscure legend of the Far East tells of an ancient Maharajah who, looking forward to being admitted to heaven, first caused a paradise to be prepared on earth. Sugar cane was created to serve as heavenly food in the ruler's earthly paradise. Upon his death the mythical paradise was destroyed, but sugar cane was allowed to spread throughout the land for the enjoyment of mortals.

←*Our Baltimore Refinery.*

The earliest written mention of sugar cane appears in records of the expedition of Alexander the Great, down the Indus River in 325 B.C. Writing of their explorations, Nearchus, one of the emperor's admirals, said they found "honey-bearing reeds."

Linked together in the Bible as articles of great value are Incense from Sheba and Sweet Cane from a far country. Another reference is by Dioscorides, a Greek physician who lived during the time of the Roman Emperor Nero. "There is a sort of hard honey," he wrote, "which is called saccharum (sugar) found upon canes in India. It is grainy like salt and brittle between the teeth, but of sweet taste withal."

By 600 A.D. sugar had become known throughout the Orient. Tai-tsung, Emperor of China (627-650 A.D.), sent envoys to India to learn the



art of extracting a syrup from sugar cane. The syrup in turn was boiled until it became a thick, dark mixture of crystalline syrup. This was somewhat similar in color to the darkest brown sugar we have today.

In the 8th century, the Egyptians devised a crude kind of refining process. Sugar cane was introduced on the Island of Sicily by Arab traders from the Nile Valley. Growing successfully on Sicily, sugar cane spread to Spain and to the other Mediterranean border countries. Records showing the income of the Sultan of Turkey in the 11th Century include 50,000 pounds of sugar as part of his revenue.

From the Moslems, the Crusaders learned the art of preserving meat with spices. From the Moslems too, they acquired a taste for sugar. Returning home, the armies of the Crusades spread word of these new food wonders. The demand thus created resulted in brisk trade between Europe and the countries of the Far East. This trade prospered until

in 1453 the Turks captured Constantinople and began to levy high tribute on passing caravans. Prior to this conquest, the Italian Republics of Venice and Genoa were the principal European seaports on the Mediterranean. They had become rich and powerful because through their ports passed most of the trade between the Far East and the Northern European countries. Restriction of that commerce by the invading Turks was the principal reason why Columbus sought a new route to India and discovered America.

In the 15th century, an inventor living in Venice devised a method of molding sugar. The inventor received a reward of 100,000 Crowns, or about \$112,000 in our money. The molded sugar became known as "pains de Venise" or Venetian loaves. The process of molding sugar into loaves was continued for nearly 400 years up to the middle of the 19th century.

←*Molding Sugar Cones, 17th century.*



Columbus carried cuttings of sugar cane to the new world on his second voyage. His letters told how he planted the cuttings in fertile soil and described the luxuriant growth of the sugar cane. Columbus quickly observed that articles of food were always gratefully received by the Indians. According to Washington Irving's biography, to win the friendship of the wary natives whom Columbus prevailed upon to visit aboard his ship, he "Gave them beads, hawks' bells and sugar, and sent them highly gratified on shore."

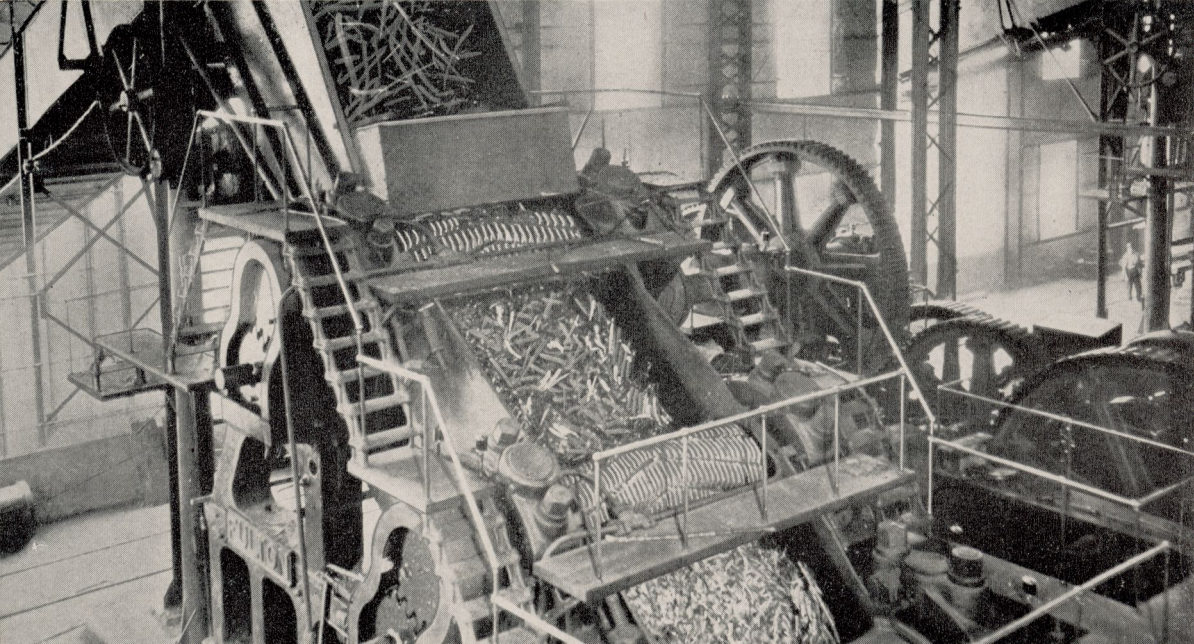
Although sugar has been known to Europeans since the return of the Crusaders in the Middle Ages, ancient modes of transportation, inefficient methods of refining and lack of an efficient distribution system prior to the 19th century combined to make sugar an expensive luxury for only the wealthy to enjoy. In fact, from an old print which features a

price-list of food products, we learn that sugar was \$2.75 a pound in London in 1742!

Modern methods of refining, packing and distribution have resulted in a greatly improved product now being offered in a variety of forms at prices within the reach of all. It is interesting to note that the most progressive countries of the world have the highest per capita consumption of sugar, while that of the more backward nations is the lowest. The people of the United States are among the largest consumers of sugar.

Sugar cane is best grown in tropical areas, the principal sources being Cuba, Puerto Rico, India, Java, the Philippine Islands, the Hawaiian Islands, South America, Egypt, South Africa, Formosa and Australia. Here in the United States, sugar cane is grown principally in the State of Louisiana and to a lesser extent in the State of Florida.

←*Loading sugar cane on ox cart in Cuba.*



PLANTING AND HARVESTING SUGAR CANE

Commercial production of sugar cane is begun by planting cuttings about a foot long, each containing two or three seed buds. A plant soon grows with several shoots that form a clump or stool of cane. One planting such as this on virgin soil in Cuba is sufficient to produce crops for from ten to fifteen years, new plants termed "ratoons" springing up from the stubble after each harvesting.

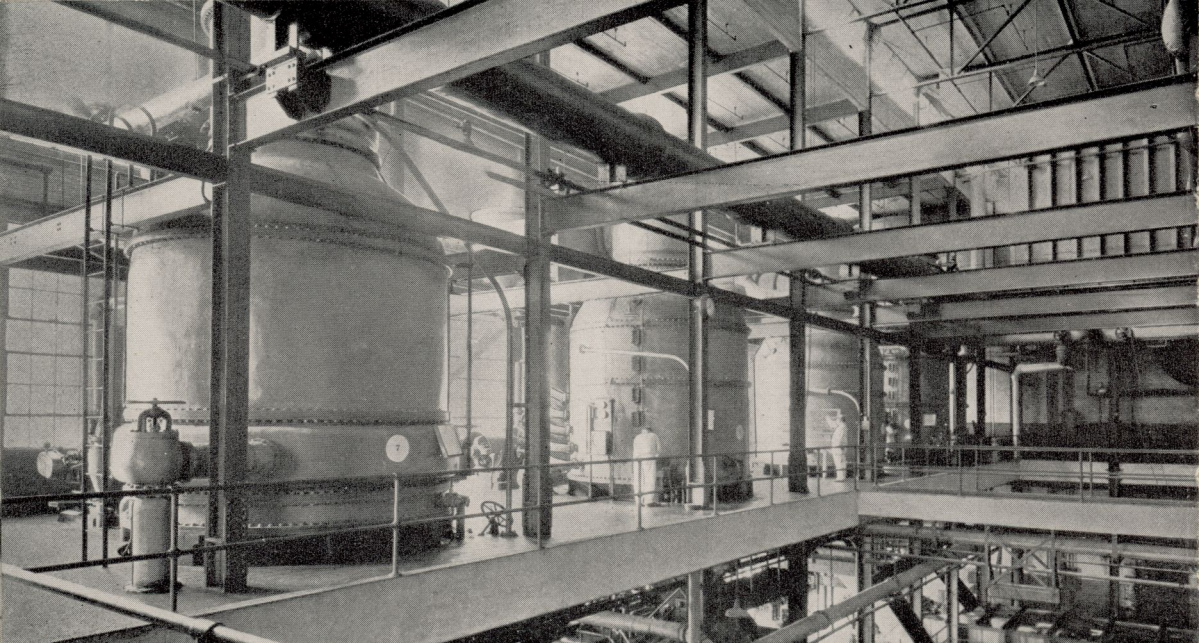
The numerous stalks sent up are very similar in appearance to growing corn, but often attain a height of from fifteen to eighteen feet. The stalks are thick and unbranched and have broad, flat leaves, three feet or more in length. The plant matures with the approach of the dry season.

When the cane is ready to be harvested, the stalks are cut by hand. Efforts have been made to

cut cane by machine, much as our grain harvesting is done, but, although many machines have been tried, so far none has come into general use. An expert workman, using a heavy machete, can cut and load about six tons of cane a day. After cutting, the leaves are stripped from the stalks which are then loaded into ox carts, the leaves serving as fodder for the oxen. Within easy hauling distance of each field there is a railroad siding and loading station. These loading stations are equipped with cranes which are able at one time to lift the full load from the cart and deposit it in the waiting railroad car.

Mill-owned locomotives haul the loaded cars to the raw sugar mill or "centrale" where fireless locomotives, which run eight hours or more on one charge of steam taken from the mill, switch them onto tilting tables. The cars have hinged sides so that, when these tables are tilted to a sufficient angle, the sugar cane load slides from the car onto a

←*Sugar cane crusher.*



conveyor which carries the cane stalks to the crushing rolls. These consist of a pair of corrugated cylinders poised one above the other, which shred the cane by twisting as it passes through. This is not to press out the juice but to separate the fibers in preparation for the grinding mills.

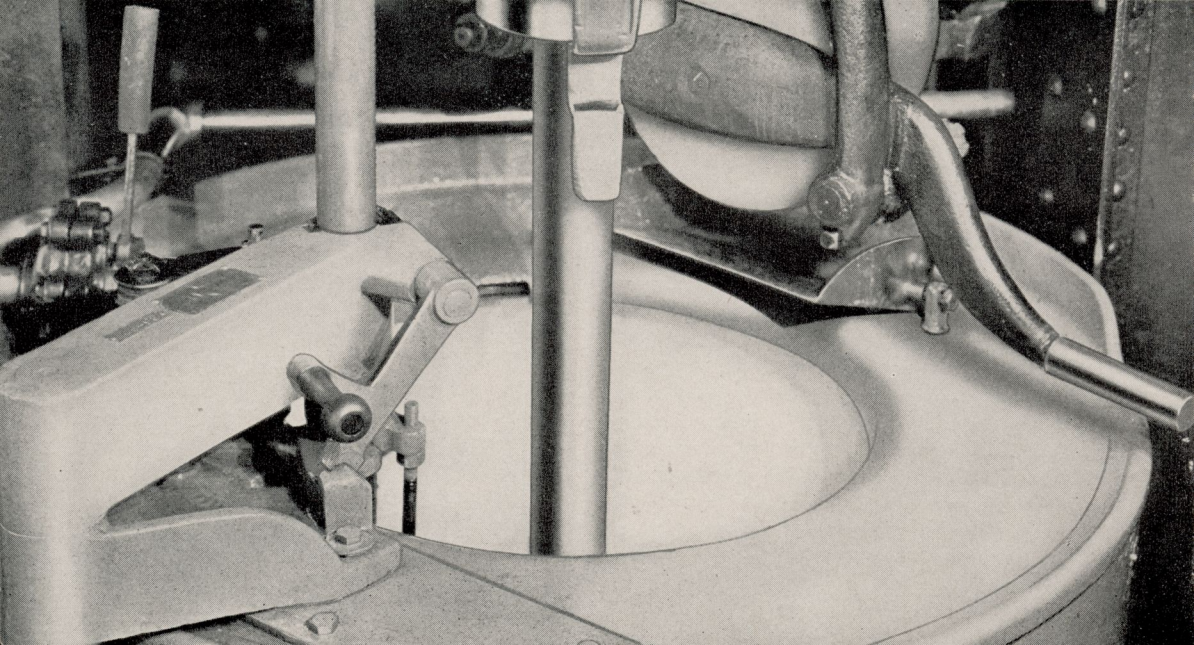
The shredded cane now passes through a series of heavy horizontal steel rollers which, revolving with tremendous pressure against each other, burst the sugar cane cells and press out the juice. Towards the last of this operation sprays of water facilitate the extraction of any remaining juice. The pulp that is left, known as bagasse, provides the fuel necessary for the power to operate the mill. Bagasse also forms the basic material for the manufacture of fiber insulation board used in building construction. The sugar cane juice, which constitutes about 80% of the entire weight of the cane, is now ready for the clarification process.

←*Vacuum pans.*

RAW SUGAR

The juice is first heated, after which lime is added to neutralize acidity and precipitate certain impurities which are then removed by filtration.

Concentration of the juice into syrup next takes place in the evaporators and granulation of the syrup is effected by boiling it in vacuum pans, large dome-shaped tanks, where crystallization takes place. It is desirable to avoid caramelization or burning of the syrup in boiling, and, since it is possible to boil liquids at lower temperature under partial vacuum than in the open air, a vacuum pump in connection with a condenser is employed to draw a partial vacuum within the pan. The resulting heavy mixture of sugar crystals and molasses goes into centrifugal machines. A centrifugal machine consists of a round basket-like container 40 to 48 inches in diameter with screen sides, suspended on a vertical



shaft within a circular metal shell. The shaft spins the basket horizontally at a speed of 1000 to 1200 revolutions per minute and the centrifugal force thus developed throws the molasses off through the screen sides, the sugar crystals being retained inside the basket. The product thus obtained is known as centrifugal raw sugar. Raw sugar is rather sticky and is of a grayish to reddish brown color.

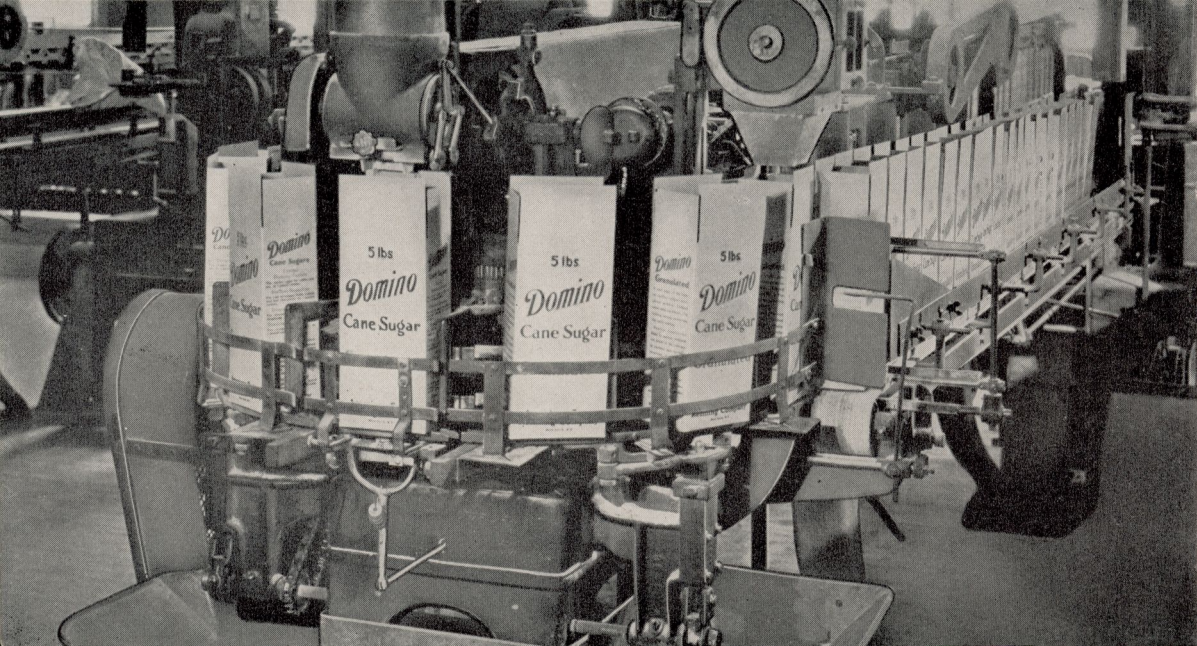
THE REFINING PROCESS

The raw sugar packed in bags is ready for shipment to the nearest seaport, where it is loaded into vessels and begins its water journey to the docks of cane sugar refineries in the United States. Sampling and weighing by representatives of the United States Government as well as the buyer and seller take place upon arrival there, the samples later being subjected to laboratory analysis to establish a basis for settlement of customs duty and purchase price.

←*Centrifugal machine.*

From the docks the bags of raw sugar are carried to chutes where the bags are slit open and the raw sugar emptied into a hopper that feeds a mechanical crusher, which breaks up any large lumps that may have formed.

It is customary at several stages in the refining process to elevate the sugar in solid form or to pump it upward in liquid form and then to utilize the force of gravity in carrying out one of the various processing operations. For example, from the crusher a bucket-type chain elevator carries the raw sugar to the top of the "wash-house" where it is emptied into minglers. The addition of syrup at this point converts the raw sugar into a thick paste called "magma" or "filmass." From the mixer the magma flows by gravity into the first battery of centrifugal machines where it is washed to remove the thin film of dark molasses that surrounds each crystal of the raw sugar. The removal of this film might be termed the



first step in the refining process. From the centrifugals the washed sugar crystals are run into melting pans where they are dissolved in warm water.

This sugar solution now has added to it diatomaceous earth, an exceedingly porous, finely divided siliceous material which assists in the extraction of impurities. It is then passed through pressure filters which contain circular screen plates covered with cotton cloth. The cloth holds back all suspended impurities together with the filter aid.

The liquid leaving these pressure filters is clear and of a high degree of purity, but is amber in color. The removal of this color is necessary to assure a high grade of sugar such as Domino Granulated, and therefore the liquid is purified again by flowing through char filters. The char filters are huge, round tanks about 20 feet high, containing granular bone char. The liquid runs brilliant and colorless or nearly colorless from the char filters.

←*Filling, weighing and sealing cartons of Domino granulated sugar.*

From the char filters the liquid passes to what is called the liquor gallery to be graded for color. Such small quantities of the liquid sugar as retain traces of color are returned to the filters, while the fully decolorized liquid passes to the "pan-house." The char, after being used for some time, has to be re-vivified by a burning process which restores its decolorizing properties. This is done over and over again.

HOW CRYSTALS FORM

After complete filtration the sugar, still in liquid form, is conveyed to the tank-like vacuum pans where steam, acting through metal coils, furnishes the necessary heat for evaporation, and formation of crystals. Vacuum pans are necessary, as described in the foregoing explanation of the raw sugar process, to enable the sugar liquid to boil at a low temperature, without burning. Boiling the sugar to grain size is one of the important steps in the re-



fining of sugar. This requires considerable skill, for it is necessary to have the vacuum pan full at the same time that the crystals are of the right size. Only by painstaking experience is the operator able to produce a maximum of crystals of whatever size required.

When the boiling process has continued until the desired grain size has been obtained, the contents of the vacuum pan are emptied into a mixer resembling a huge trough set upon the floor below. Revolving paddles maintain a uniform mixture of the warm sugar crystals and syrup comprising the magma and prevent the mixture from hardening. Now the sugar crystals must be separated from the syrup which still surrounds them. This is done in more centrifugal machines.

DOMINO SUGARS ARE PURE

After the syrup is thrown off, the sugar crystals

deposited on the screen sides of the centrifugal machine are sprayed with pure water or a sugar solution while the machine is still spinning, to remove the last traces of adhering syrup from each grain. When the machine is stopped, the crystalline sugar shows in the inner basket, pure, white and sparkling, ready to be carried by conveyors to huge revolving granulators or drying drums where a strong current of heated air absorbs the remaining moisture from the sugar. The dried granulated sugar now passes across inclined vibrating screens which grade the crystals according to size.

After screening, the refined sugar passes to large bins or directly to the weighing and packaging machines. Under the guidance of skilled operators these wonderfully ingenious machines fill bags and sew them. Other mechanical wonders pack and seal the many different varieties of sugar in clean packages. These are the familiar Domino cane sugars in

←*Sawing Adant sugar slabs, clipping into tablets and packing of cartons.*

sturdy cartons and strong cotton or paper bags that guarantee to the housewife purity and correct weight.

THE ADANT PROCESS

In this exclusive process for making Crystal Domino Tablets and Squares, the raw sugar goes through much the same initial process as in making Domino Granulated. The sugar liquor is char filtered twice, however.

From the vacuum pans the magma goes to the mixer where slowly revolving paddles constantly stir it until it is emptied into the Domino molds. These cylindrical molds, which are divided into rectangular compartments, are mounted on trucks that run on iron rails so they can be easily moved in the course of progressive operations. Filled with sugar, a mold weighs nearly 800 pounds. After each mold is filled it is set aside to cool and complete the

crystallization. For best results this takes twenty-four hours. After cooling, the molds are forced from their containers by compressed air. A crane then carries the mold to a centrifugal machine. Here the sugar is treated with pure sugar syrup which is then thrown off by spinning the filled molds in these special centrifugal machines, carrying with it the last traces of color.

A crane next carries the mold to the dryer. The sugar slabs are taken from the mold and placed on trucks which move slowly through an oven. After drying for several hours, these slabs are ready to be cut. Careful inspection of the slabs is first made to assure their freedom from discoloration of any kind. Slabs that pass inspection are sawed in strips which continue on by conveyor to the clipper, a combination of upper and lower knives which clip the strips into tablets or squares. It is by means of this exclusive process that the brilliant, sparkling appearance

of Crystal Domino Tablets and Squares is obtained.

From the clipper, conveyors take the tablets either to be packed into cartons, or, if intended for restaurant service, to the wrapping machines. Through these machines is fed a continuous stream of small paper wrappers which bear the insignia of the hotel or restaurant for which they are intended. Each wrapper encloses an individual sugar tablet, over one hundred tablets per minute being wrapped by each machine. From these machines the Crystal Domino Tablets, individually wrapped, are packed by girls into boxes for shipment.

Nutrition is a subject of national interest, and well it may be, for building and maintaining a strong America calls for proper nutrients. Sugar is an important nutritional element and in addition makes good foods taste better. It is an excellent and

economical source of the energy and body fuel needed in a balanced, healthful menu.

Our bodies assimilate sugar and convert it into energy with extraordinary rapidity, releasing the energy stored up in the sugar cane by the magic of nature and the tropical sun. The average American eats more than half his weight in sugar every year. It is important that a food product consumed to such an extent be pure and clean.

For over fifty years The American Sugar Refining Company has been improving refining processes and distribution technique. Today Domino is the best known brand of sugar in America. There are Domino Sugars for every baking, cooking and serving need. All Domino Sugars are highest quality, clean, refined cane sugars in full weight cartons and cotton or paper bags, packed and sealed at the refinery for your protection.

Popular Domino Sugars and Their Uses



Crystal Domino Tablets and Squares

— Crystallized by the exclusive Adant Process. Brilliant, sparkling — for hot coffee and tea.



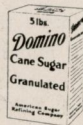
Domino Yellow (light brown)

— Has a delicate cane flavor. For coffee cake, cookies, bread puddings, sauces and candy making.



Domino Granulated

— Extra fine granulated sugar in refinery sealed packages for baking, cooking, preserving.



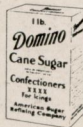
Domino Old Fashioned Brown (dark brown)

— Rich in cane flavor. Pure, wholesome, nutritious. Good for gingerbread, baked ham, baked apples.



Domino Confectioners XXXX

— For quick delicious cake frostings. Simply add milk or water, flavoring; then mix and spread.



Domino Superfine Powdered

— Pours freely, dissolves quickly. Ideal for iced drinks, fruits, cereals and for sprinkling over pies, cookies, doughnuts.



“Sweeten it with Domino”